

Breakout Session G: Ideas in Visualization

Overview

Visualising estimates of low-dimensional random variables and their uncertainty is a rather straightforward problem. Also for time series and stochastic processes there are several good options for displaying uncertainty, such as simultaneous envelopes and functional boxplots. Uncertainty visualization for spatial and spatio-temporal fields is, however, not as straightforward. It is nevertheless of great importance when communicating results in spatial statistics and related subjects, or as Brodlić et al. (2012) writes:

We may encounter error bars on graphs, but we rarely see the equivalent on contour maps or isosurfaces. Indeed the very crispness of an isosurface gives an impression of confidence that is frankly often an illusion. This is a major issue when visualizations are used in decisionmaking - such as planning evacuations based on a visualization of the predicted hurricane path.

The central topics of discussion for this session are:

1. What is the best way of visualizing estimates of spatial fields and their uncertainties?
2. How should one do visualization for more complicated scenarios, such as problems in three spatial dimensions, spatio-temporal applications, and hierarchical models?

Some commonly used methods, which will serve as a starting point for the discussion, are given in the references below. Contact David Bolin if you have suggestions for the session or would like to add further references.

References

- D. Bolin and F. Lindgren (2015): Excursion and contour uncertainty regions for latent Gaussian models, *Journal of the Royal Statistical Society, Series B Methodology*, 77, 1, 85-106
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- K. Brodlić, R.A. Osorio, and A. Lopes (2012): A Review of Uncertainty in Data Visualization, in *Expanding the Frontiers of Visual Analytics and Visualization*, 81-109, Springer London
- A. M. MacEachren, A. Robinson, S. Hopper, S. Gardner, R. Murray, M. Gahegan, and E. Hetzler (2005): Visualizing Geospatial Information Uncertainty: What We Know and What We Need to Know, *Cartography and Geographic Information Science*, 32:3, 139-160
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